REMARKS

In Paragraph 2 at page 2 of the Office Action, the Examiner refers to the trademark "SIROCCO", and requests that it should be capitalized and accompanied by generic terminology.

Applicants respond as follows.

A sirocco fan is well known in the art as a centrifugal fan having multiple narrow blades curved forward and mounted at a periphery of a braced, open drum. This is not a trademark, does not need to be capitalized, and generic terminology is unnecessary since this type of fan is very well known. (See the attached internet definition and description.)

The Examiner objected to the use of "means-plus-function" language to define features of Applicants' invention, because the specification is said to not clearly identify corresponding structure which performs the function recited in the claimed element.

In response, pursuant to MPEP § 2181, Applicants identify the structure which performs the claimed functions as follows:

With respect to the "means for supplying the oxygen-enriched gas at a first flow rate...and at a second flow rate" Applicants identify corresponding structure as the combination of flow-rate setting unit 45, electromagnetic valve 47, bypass flow passage 50 and controller 59. See "(2) Breath Synchronization Function" at pages 31-33 (when controller 59 opens and closes the electromagnetic valve 47, oxygen-enriched gas is supplied at a high flow rate over the inhalation as set by row-rate setting unit 45. When controller 59 closes the electromagnetic valve 47, oxygen-enriched gas is supplied at a flow rate lower than the continuous base flow rate via bypass flow passage 50).

For the claimed "means for supplying the oxygen-enriched gas at a third flow rate", Applicants identify corresponding structure as flow rate setting unit 45. See page 27, lines 4-6...(by adjusting an orifice, the continuous base flow rate (third flow rate) can be set within a range up to the continuous base flow rate).

means

For the claimed "means for detecting the state of inhalation or exhalation...and for controlling supply of the oxygen-enriched gas based on a signal output from the sensor", Applicants identify the corresponding structure as controller 59. See page 28, lines 20-23 (...the controller 59 performs a predetermined calculation on the basis of signals obtained from the flow-rate setting unit 45, the oxygen sensor 51, and the pressure sensor 53, and controls the operations of the directional control valves 17 and the electromagnetic valve 47).

For the claimed "means for detecting the state of inhalation or exhalation one time or plurality of number of times...and for determining the timing for starting or ending subsequent supply of the oxygen-enriched gas", Applicants identify the corresponding structure as controller 59. See page 34, lines 17-20 and page 37, line 1-14.

It is respectfully submitted that the structure corresponding to the means-plus-function claim limitations is clear to those skilled in the art, and that amendment of the specification is unnecessary. Withdrawal of the objection to the specification is respectfully requested.

In response to the objection to claim 2 (as to the language "representing a flow rate"), claim 2 has been canceled and claim 9 has amended to more clearly recite that the first flow rate is greater than a continuous base flow rate at which the oxygen enriching apparatus can supply the oxygen-enriched gas continuously.

Withdrawal of the objection is respectfully requested.

Claims 3-6, 10 and 24 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite with respect to the claimed "third flow rate" as recited in claim 3, the "continuous base flow rate" as claimed in claim 10, and as lacking sufficient antecedent basis for "the breath detection port" as claimed in claim 4.

In response, claim 3 has been canceled and claim 10 has been amended to more clearly recite that the third flow rate (when the breath-synchronized operation is not performed) is equal to or less than the continuous base flow rate. Also, claim 10 has been amended to refer to "the" continuous base flow rate as defined in claim 9. Claim 4, depending from claim 1 refers to "the breath detection port". Claim 1 defines the breath detection port connected to the inhaler for detecting the user's state of breathing. There is no lack of antecedent basis.

It is respectfully submitted that the claims as amended fully comply with 35 U.S.C. § 112, and withdrawal of the foregoing rejection is respectfully requested.

Claims 1, 4-8, 15, 25 and 27 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent 5,720,276 to Kobatake et al. Kobatake et al was cited as disclosing an oxygen enriching device substantially as claimed, including a main passage having a control member that adjusts the opening therein, a tank downstream of an oxygen enriching section, and a switch that allows the device to provide either a continuous flow of oxygen or a pulse flow delivered during a time that corresponds to 25-40% of the breath cycle.

Applicants respectfully traverse for the following reasons.

argues

The oxygen enriching apparatus of present claim 1 has (i) an oxygen outlet, and (ii) a breath detection port (to which no oxygen-enriched gas is supplied) separate from the oxygen outlet.

The oxygen outlet is an opening portion for supplying oxygen-enriched gas to a user. When the breath synchronization function is not used, the oxygen-enriched gas is continuously supplied to the user at a constant flow rate. When the breath synchronization function is engaged, the oxygen-enriched gas is supplied to the user while the supply flow rate is changed in accordance with breathing cycles.

On the other hand, the breath detection port is an opening portion to which an inhalator (e.g., a tube of a nasal cannula) is connected so as to detect the user's state of breathing. The oxygen-enriched gas is not supplied to the user from the breath detection port. See page 6, lines 19-22 of the specification.

Accordingly, when a pressure sensor, for example, is disposed at the breath detection port, pressure changes that propagate to the breath detection port via the inhalator can be detected in order to grasp the user's state of breathing (timings of inhalation and exhalation). See page 6, line 22 - page 7, lines 2 of the specification.

Therefore, when a pressure sensor, for example, is disposed at the breath detection port, the state of breathing can be accurately determined.

Namely, as shown in Fig. 2, a first tube 58 extending from a cannula (nasal cannula) 56 used by a patient is connected to the oxygen outlet 49.

Accordingly, oxygen-enriched gas is supplied from the oxygen outlet 49 at a predetermined flow rate set by use of the flow-rate setting unit 45 and under a pressure reduced (to 0.35 atm) by means of the regulator 41.

As shown in Fig. 2, a second tube 60 branching from the cannula 56 is connected to the breath detection port 54. The pressure sensor 53 disposed at the breath detection port 54 can detect, from a pressure fluctuation, a time at which each inhalation period starts.

A pair of opening portions 57 and 59 (inserted into the nose) of the cannula 56 are each divided into semicircular first and second opening portions 57a, 59a and 57b, 59b.

The first opening portions 57a and 59a communicate with the oxygen outlet 49 via the first tube 58.

The second opening portions 57b and 59b communicate with the breath detection port 54 via the second tube 60.

Turning to the cited prior art, in Kobatake et al, as indicated by nasal cannula 36 in Fig. 1, Fig. 3 and Fig. 4, a breath detection port (to which no oxygen-enriched gas is supplied) is not provided separately from the oxygen outlet. For example, as shown in Fig. 1 of Kobatake et al., pressure sensor 34 is provided in conduit 18 (which delivers oxygen-enriched gas) to detect the changes in the pressure of the respiratory gas for the patient (column 6, lines 15-17 and Fig. 1).

Thus, when a pressure sensor, for example, is disposed at the breath detection port, the state of breathing cannot be accurately determined.

That is, the present invention differs from Kobatake et al in that the apparatus in Kobatake et al does not have an oxygen outlet separate from a breath detection portion as required by present claim 1.

Although claim 1 adequately recites that the oxygen enriching apparatus has each of an oxygen outlet and a breath detection port connected to the inhalator, new claim 29 depending from claim 1 explicitly recites that the breath detection port is provided separately from the

oxygen outlet (support at page 7, lines 9-11 of the specification). Claim 30 further recites that no oxygen-enriched gas is supplied to the breath detection port (support at page 6, lines 21-22 of the specification).

Therefore, Kobatake et al does not meet the terms of the rejected claims, and withdrawal of the foregoing rejection under 35 U.S.C. § 102(b) is respectfully requested.

Claims 2, 3, 9-13, 16, 23, 24, 26 and 28 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Kobatake et al in view of U.S. Patent 6,123,074 to Hete et al. Hete et al was cited as teaching means for providing oxygen-enriched gas at a flow rate above an average flow rate signal during inhalation and decreasing the flow of gas below the average flow rate signal during exhalation, citing column 8, line 66 to column 9, line 27. The reason for rejection was that it would have been obvious to modify the oxygen enriching apparatus of Kobatake et al so as to control gas flow to the user to provide an oxygen-enriched gas at first, second and third flow rates as taught by Hete et al.

Applicants respectfully traverse for the following reasons.

The rejected claims are patentable over Kobatake et al in view of Hete et al for the same reasons that claim 1 is patentable over Kobatake et al alone. Similar to Kobatake et al, in Hete et al flow transducer 28 is provided in-line with conduit 20 for delivering breathing gas to mask 22, and does not have a breath detection port separate from an oxygen outlet as required by independent claims 1 and 9. Therefore, Hete et al does not remedy the deficiencies of Kobatake et al with respect to these claims.

Withdrawal of the foregoing rejection under 35 U.S.C. § 103(a) is respectfully requested.

Claims 17, 19 and 21 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Kobatake et al in view of U.S. Patent 6,237,594 Davenport. Davenport was cited as disclosing an oxygen supply device having a number of tanks allowing for delivery of a broad range of flow without negatively impacting performance of the valves and sensors.

Claims 18, 20 and 22 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Kobatake et al in view of Hete et al, further in view of Davenport.

Applicants rely on the response above with respect to the rejection over Kobatake et al alone.

Withdrawal of all rejections and allowance of claims 1, 4-10, 12, 14-22 and 24-32 is earnestly solicited.

In the event that the Examiner believes that it may be helpful to advance the prosecution of this application, the Examiner is invited to contact the undersigned at the local Washington, D.C. telephone number indicated below.

Respectfully submitted,

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WASHINGTON OFFICE
23373
CUSTOMER NUMBER

Date: December 4, 2003

Sirocco fan

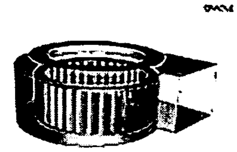
A centrifugal fan, invented by Samuel Davidson in 1898, with 64 narrow blades curved forward, mounted at the periphery of a braced, open drum. It is a high-speed, small-diameter fan, usually direct driven. It was a popular fan in Great Britain for many years. See also: Waddle fan
Nelson

SC/Tetra

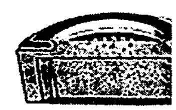
Application

Sirocco Fan

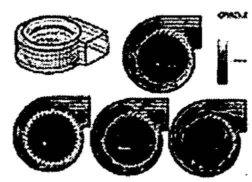
An analysis of a sirocco fan requires many hours of work for mesh generation and transient state calculation, as well as any other kind of axial fans. SC/Tetra offers the discontinuous mesh interface and moving boundary functions for such a model. The meshes for the static casing and the rotating blades are generated separately using the auto-mesh generator. Afterwards, the two meshes are combined with a "discontinuous mesh interface" defined on their boundary, and can be analyzed easily as a single model. The red rectangular shown in the top-right figure (→click) indicates the faces of the discontinuous interface. Alternative possibility is to use the steady ALE function - only the rotating section of a fan is treated in a rotating frame in the steady-state calculation. SC/Tetra provides solutions for a wide variety of fan developers who have not been able to do a performance analysis due to time limitations.



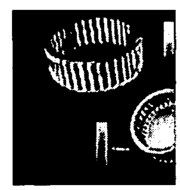
Model of Sirocco fan



Cut view of element indicates discontinu



Oil flow lines at different sections



Turbulence energy a contour ma